

Editorial



Sustainable solutions to environmental challenges through enhanced public awareness

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How to cite

Nath, B., Rahman, M.M., Mondal, P., Kahara, S., Bhattacharya, P., 2025. Sustainable solutions to environmental challenges through enhanced individual awareness. *Journal of Environmental Science, Health & Sustainability*, 1, 1, 3–7. <https://doi.org/10.63697/jeshs.2025.030>

Article info

Received: 15 March 2025

Revised: 16 April 2025

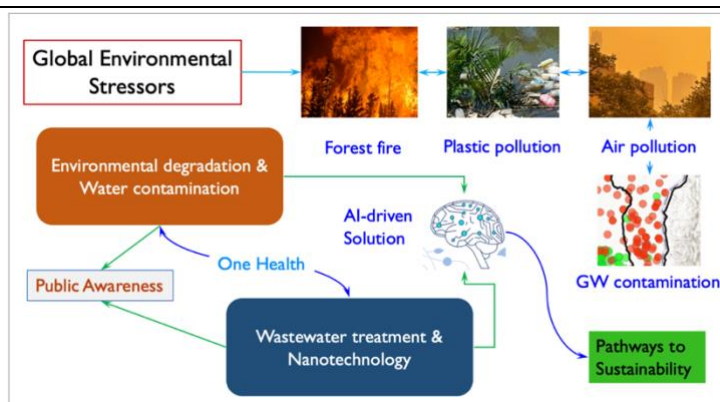
Accepted: 17 April 2025

Published: 30 April 2025

Keywords

Environment
Sustainability
Remote sensing
Geospatial artificial intelligence
One Health

Graphical abstract



Highlights

- Focuses on key environmental challenges and sustainability solutions.
- Growing urgency of global issues such as climate change and ecosystem degradation.
- Calls for combined policy, technology, and individual action.
- Promote innovation like GeoAI and better waste management.

Abstract

We are excited to announce the launch of the inaugural issue of the *Journal of Environmental Science, Health & Sustainability*, the flagship publication of *Enviro Mind Solutions*. This launch marks the beginning of our commitment toward advancing high-quality interdisciplinary research at the intersection of environmental science, sustainability, and One Health. The journal aims to serve as a platform for innovative studies that tackle emerging global environmental challenges, leveraging state-of-the-art techniques such as remote sensing for data collection, geospatial artificial intelligence and hydrogeological modeling for data analytics and decision-making. We aim to catalyze impactful research that informs policy, guides sustainable practices, and fosters a global research community committed to transformative environmental solutions. Our first issue features insightful research that reflects the journal's mission and sets the foundation for future contributions. Through the dissemination of impactful studies that inform policy and practice, we aim to foster a strong, collaborative research community and drive meaningful solutions for a sustainable future.

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This editorial was reviewed by Dr. Laurent Charlet



I Introduction

The inaugural issue of the *Journal of Environmental Science, Health & Sustainability* contains five research articles addressing critical environmental challenges. The research studies include:

- the distribution of trace elements in agricultural soils and their uptake by crops,
- water quality monitoring, focusing on potability of groundwater caused by arsenic (As) contamination and microbial pathogens,
- the city dwellers' perception of the role of urban agriculture in environmental sustainability,
- land use and land cover (LULC) changes and urbanization in the East Khasi Hills district, India, and
- the estimation of heavy metals in the edible muscle tissue of finfish and shellfish from a mangrove ecosystem in Indian Sundarbans.

This inaugural issue marks the beginning of our journey to provide a platform for open scientific dissemination, foster academic collaboration, and support informed decision-making and policy dialogue to address global environmental challenges.

2 Water for life

Water is essential for life; however, both surface water and groundwater are facing challenges in both quantity and quality (Wang et al., 2024). Groundwater, which far exceeds surface water as a freshwater source and provides a stable year-round supply, is increasingly relied upon to meet growing water demands (Bhattacharya and Bundschuh, 2015). As the largest accessible source of freshwater on Earth, groundwater plays a crucial role in providing drinking water and supporting economic development, especially in developing countries (Davamani et al., 2024). Its accessibility makes it a preferred source, but increasing demand, climate change, land use changes, and over-extraction for agriculture and industry pose serious threats to its quality and availability (Schroeter et al., 2025). In many regions, continuing groundwater stress threatens food security, water availability, and energy supply and pose a significant challenge for sustainable development. Addressing these issues requires mitigation and adaptation strategies, improved assessment and understanding of groundwater systems within economic, social, and environmental contexts, and the implementation of policies that ensure the protection and sustainable management of this vital resource (Mukherjee et al., 2024; Sahoo et al., 2024).

Pollution from chemical, biological, and microbial contaminants continues to compromise water

availability and potability (Kazemi et al., 2024). Contamination of water occurs through both point sources such as sewage outflows and non-point sources such as urban runoff and agricultural drainage (Liu et al., 2023). The growing presence of emerging pollutants—such as pharmaceuticals, microplastics, antibiotic resistant genes and pathogens—in freshwater ecosystems presents a significant threat to environmental health and the One Health framework (Ferrante et al., 2023). These contaminants easily make their way into waterways, rivers, and oceans, endangering aquatic and marine lives. Therefore, water conservation and management practices—such as water-efficient infrastructure, wastewater treatment technologies, managed aquifer recharge, and stronger water use policies—are crucial for sustainability.

3 Urbanization, environmental transformations, and the climate crisis

Urbanization, population growth, deforestation, and unsustainable agricultural practices and groundwater utilization are rapidly reshaping natural landscapes, significantly altering hydrological cycles, biogeochemical processes, and the long-term sustainability of natural resources (McGrane, 2016). Urban development and advancements in technological innovations drive economic growth. However, they might pose challenges to sustainability by increasing the probability of natural disasters, forest fires, landslides, intensified pluvial flooding, droughts, increasing atmospheric carbon and land surface temperature. These environmental changes contribute to hazards such as air pollution from industrial activities and transportation, exacerbating public health issues.

A critical factor in this environmental transformation is the role of trees, especially canopy cover and shade, in regulating the Earth's energy balance (Nath and Ni-Meister, 2021). Trees absorb solar radiation and help regulate surface temperatures, but urbanization and climate change are disrupting this balance, leading to increased retention of solar radiation in the atmosphere (Ouyang et al., 2022). As a result, Earth's surface temperatures and CO₂ concentrations are rising, increasing the intensity and frequency of extreme weather events, flooding, and drought (Robinson, 2021).

These rapid changes present significant challenges for scientists, policymakers, and government officials working to develop effective solutions through national policies and global climate agreements. Addressing these issues requires a globally coordinated and collaborative framework to ensure sustainable growth. Strong environmental regulations and policies are

essential to safeguarding both ecosystems and human well-being. While large-scale efforts are crucial, individual actions also play a key role. Adopting a low-carbon lifestyle, reducing fossil fuel consumption, and supporting eco-friendly initiatives can all contribute to a more sustainable future.

4 Water treatment and recycling

The complexity of modern wastewater streams, especially from plastic processing, presents significant challenges for conventional treatment technologies. Membrane technologies, particularly in downstream applications, have proven effective in removing microplastics and recovering valuable resources in wastewater treatment and recycling, where conventional treatments fall short (Poerio et al., 2019; Khanzada et al., 2024). The membrane-integrated treatment technology emerged as critical components in downstream treatment, offering advanced capabilities by ensuring compliance with environmental standards and enabling water reuse (Botelho Junior et al., 2023). These systems contribute significantly to water reuse and waste management practices and support circular economy. Despite their proven effectiveness in downstream wastewater treatment, membrane technologies face several implementation barriers, including fouling, high operational costs, energy demands, and concentrate management (Acarer, 2023). Addressing these challenges through material innovation, process optimization, and integrated system design is essential for broader adoption in treating complex effluents. Therefore, to fully realize the benefits of membrane technologies in downstream wastewater treatment, supportive policy frameworks must evolve to enforceable limits set for emerging contaminants, clear guideline for concentrate disposal and incorporate membrane-based approaches into broader water reuse and circular economy.

5 Geospatial artificial intelligence in environmental science

Groundwater is essential for agriculture, industries, and drinking water, but its extensive use alters aquifer hydraulics, redox transformations of minerals, and impacts water quality (Mukherjee et al., 2021). The presence of geogenic contaminants and accumulation of agricultural chemicals in soils and groundwater threatens food security, impairs cognitive function in children, and increases the risk of cancer in adults. However, the long-term effects of groundwater pumping on the stability of chemical contaminants over decades remain poorly understood, posing a significant challenge to sustainable groundwater management. Geospatial Artificial Intelligence (GeoAI), which

integrates artificial intelligence (AI) and geographic information systems (GIS), is emerging as a powerful tool in environmental science, human health, and sustainability (Nath et al., 2022). Given the complexity of environmental systems, the uncertainty in the contaminant distribution, and the vast volume of geochemical data, GeoAI enhances our ability to analyze the geochemical processes, assess groundwater quality and predictive modeling of high-risk areas (Ijumulana et al., 2020; Ijumulana et al., 2021; Mukherjee et al., 2021; Ijumulana et al., 2024). This technology offers a data-driven approach to safeguarding water resources and mitigating environmental risks.

6 Path to sustainability

Achieving sustainability requires a systematic, adaptive approach that prioritizes environmental sensitiveness and community well-being. Governments must implement policies that balance development with ecological conservation, while efforts to minimize waste and maximize efficiency should be actively promoted. Public education and awareness campaigns play a crucial role in driving societal change and encouraging individuals to adopt sustainable lifestyles. Advancements in renewable energy, sustainable agriculture, and green infrastructure offer powerful solutions for mitigating environmental impacts (Bathaei and Štreimikienė, 2023). At the individual level, even small actions such as reducing energy consumption, minimizing waste, and supporting sustainable businesses can contribute to long-term systemic change.

7 Conclusion

The inaugural issue of the *Journal of Environmental Science, Health & Sustainability* highlights critical environmental challenges and innovative solutions through interdisciplinary research. Addressing issues such as trace element distribution in soils, urban agriculture and its role in sustainability, water quality monitoring, land use changes, and heavy metal contamination in aquatic environment, the journal underscores the urgency of sustainable environmental management. As global environmental challenges like water scarcity, pollution, urbanization, climate change, and ecosystem degradation intensify, integrated approaches which lead to leverage policy frameworks, technological advancements, and individual action are essential. Effective wastewater treatment and recycling, including plastic waste management, are necessary for controlling point and non-point sources of pollution. A globally coordinated, environmentally responsible approach is essential to achieve meaningful and lasting change. As this inaugural issue demonstrates,

leveraging policy, technology, and individual behavior is key to addressing the complex challenges facing our planet. By integrating interdisciplinary science with innovative tools such as GeoAI and sustainable resource management, we can chart a path toward a resilient and equitable future.

8 Acknowledgements

We thank publisher, the members of the editorial board, reviewers, and authors to make this issue possible.

9 Author contributions

All authors contributed to drafting and revising the manuscript and approved the final version for publication.

10 Conflict of interest

The authors declare no conflict of interest related to this study.

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